

Understanding and Reading a Topographic Map

Pre Lesson Two/SS

Time: 60 minutes

Age: Grades 3-5

Setting: Indoors

Standards:

Environment and Ecology

Watersheds and Wetlands

4.1.7.B: Understand the role of a watershed.

Geography

Basic Geographic Literacy

7.1.3.A: Identify geographic tools and their uses.

7.1.6.A: Describe geographic tools and their uses.

7.1.3.B: Identify and locate places and regions.

7.1.6.B: Describe and locate places and regions.

The Physical Characteristics of Places and Regions

7.2.3.A: Identify the physical characteristics of places and regions.

7.2.6.A: Describe the physical characteristics of places and regions.

Reading, Writing, Speaking, and Listening

Types of Writing

1.4.5.B: Write multi-paragraph informational pieces.

Quality of Writing

1.5.5.A Write with a sharp, distinct focus identifying topic, task, and audience.

1.5.5.B: Write using well-developed content appropriate for the topic.

1.5.5.C: Write with controlled and/or subtle focus.

1.5.5.D: Write with an understanding of the stylistic aspects of composition.

Objectives:

- Students will demonstrate an understanding of contour lines by creating a contour map out of the ridges and valleys of their hand.

- Students will interpret a topographic map by outlining the border of the local watershed.
- Students will write a short paragraph describing the characteristics of the land use with in their watershed.

Overview: Much information about an area can be obtained from reading a topographic map. Before this can occur, students must understand the components of a map.

Materials:

- Water based markers
- Topographic maps (enough for one per every four students)
- Student worksheet
- Pencils

Procedure:

1. Begin with a review of the parts of a watershed (stream order, mouth, headwater, source and tributaries.)
2. Ask students how they would show a hill if they had to draw it from a birds-eye view on a piece of paper. Introduce the concept of a topographic map. Maps are flat, but the areas they represent are filled with hills. We show hills with contour lines.
3. To understand how contour lines work, have students make a fist with their non-dominant hand. A fist has width, length and height, just like the land. With a water-based marker, have students draw a circle around the highest knuckle. Draw a second circle just below that one. Draw a third circle just below that one. Notice that in order to stay level, the pen must trace around another knuckle before the third knuckle closes. Continue to draw circles, each one beneath the last. Lines will wander in and out of the “valleys” between the knuckles and over the “broad slopes” on the back of the students’ hands.
4. After all the lines are drawn have the students open their hands. Now it is flat, like a map. But by looking at the circles, the students can see where their knuckles had been, and the “topography” of their hands. Lines close together show steepness, lines farther apart show flat or gentle slope. Explain that all points along a contour line are the same elevation.
5. Pair students and have them do the same thing on their non-dominant hand. Putting the two fists side by side, demonstrate the boundaries of a watershed. They will see two high ridges, with a valley in between. The bottom of the valley is where you would expect to see a stream.
6. Understanding how the contour lines represent valleys and ridges may be the most challenging thing about reading topo maps. Contour lines that represent a valley or depression usually are V- or U- shaped, with the tips of the V’s pointing toward higher elevations. V’s or U’s also represents lines that show a ridge, but the tips

are pointing toward lower elevation. Water flows through the valley perpendicular to contour lines.

7. Different scales of topo maps cover different size quads, or a four-sided region bounded by lines of latitude and longitude. The most detailed maps are the USGS (United States Geographical Survey) 7.5-minute series. The area of this map is 7 miles wide and 7 miles long. One inch on the map equals 24,000 inches on the ground (1:24,000 series).
8. Divide students into groups of four. Hand each group a topographic map of the school district. As a group, locate the school. Have students describe the lay of the land by “reading” the topographic map—ask questions such as: At what elevation is the school located? Where is the closest stream? What is the elevation at the stream? What is the highest point on the map, etc.
9. Discuss what the various symbols and colors of the map mean. Show them the map key. Have them locate different features that they may recognize on their maps.
10. Have students trace the nearest stream to its headwater (if on map). Have them follow any tributaries that might feed into the stream, or any larger streams into which it may feed. List those tributaries on the board.
11. In closing, have students use the maps to describe the watershed in which their school is located.

Assessment:

Ability to locate items on the map and interpret the map, demonstrated through the accurate answering of questions.

Extension: Give each student some clay and have him or her use the topographic map to create a model of the area around the school.

**Lesson adapted from: The Streamkeeper’s Field Guide

figure 2.2

